

is doing too much, and consequently that he must rest until fully recovered, and then continue more slowly. This is very important, because there is a very prevalent idea among young men and boys with athletic aspirations that they can "improve their wind" by persisting in an effort when their hearts are already taxed to the utmost limit; and unfortunately the same notion exists among men of middle life who have become fat through overeating and sedentary habits, so that they undertake some task for which they are wholly unprepared, and bring on an attack of heart failure which not infrequently proves fatal. Those patients who cannot take a few steps without inducing dyspnea are not fitted for active exercise, and must be treated by rest, massage and passive movement until the myocardium has recovered sufficiently to permit the employment of resistance movements, and subsequently light forms of active exercise may be prescribed. The Nauheim treatment, with its combined system of baths and gymnastics, is particularly well adapted to this class of cases, not only because of the direct influence upon the heart and blood vessels, but also for the reason that the improved circulation, through the lungs, liver and kidneys, indeed throughout the entire body, conduces to more perfect metabolism and elimination of waste material, and in this way attacks the disease at its origin. Much discredit has been brought upon this method by the haphazard way in which it is sometimes carried out; for while there is only a small proportion of patients to whom it will not be of at least temporary benefit, still there are a few to whom it is wholly inapplicable; furthermore, what is equally important, the directions regarding the strength, duration and frequency of the baths, as well as those relative to the extent and character of the gymnastics, should be the result of a study of the capabilities and requirements in each case, and not simply a perfunctory turning of the patient over to an attendant, with the instructions that he is to have a Nauheim bath, as if it were of no more importance than having his face sponged.

(To be continued.)

## TREATMENT OF TYPHOID FEVER.

### OUTLINE OF TREATMENT AND RESULTS IN SOME OF THE CASES OF THE PALO ALTO EPIDEMIC OF 1903.

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THE OBJECT of the present paper is to give in some detail the treatment of the cases that came under my observation during the epidemic at Palo Alto and Stanford University last spring. Some unusual opportunities were presented to observe, within a short space of time, a considerable number of cases, and as a fairly uniform plan of treatment was adopted and seemed to be generally successful, it may be of value to review it. In the first place some of the difficulties to be met with should be mentioned, for, just as this epidemic came down suddenly upon a wholly unprepared community, so may almost any other community, large or small, be suddenly called upon to face a similar situation. Particularly is this true with our present "happy-go-lucky" control of water supplies, dairies, vegetable gardens, oyster beds, etc. A university community is especially unfortunate when called upon to meet a typhoid epidemic, as it contains so many individuals of susceptible age, the majority of whom are living away from the ordinary facilities of home in the matter of protection, nursing and food. Besides, students are very prone to take poor care of their health, and so pay but little attention to such symptoms as frequently inaugurate typhoid fever.

I have briefly traced the general plan of management adopted in the present epidemic.\* Where no hospital facilities are to be had they must at once

be instituted for the proper care of typhoid fever. I am fully convinced that the most essential thing in the treatment of typhoid is prompt recognition of the condition, and immediate rest in bed, with proper food and care. Without exception, the fatal cases and the most serious ones that came under my observation, were in persons who had, for one reason or another, kept up and about and eaten improper food after the onset of the symptoms. This was particularly striking in some of the fatal cases. For this reason, above all others, the typhoid fever suspect must at once, and with as little transportation and strain as possible, come under proper care, and stay there until freed from the suspicion of the disease or well again after the fever. In the present epidemic we found it very convenient to group the patients in certain houses or portions of buildings used for residence (dormitories, for instance), and to organize there an emergency hospital, with trained nursing staff and equipment.

Where this was not possible, and cases could not be sent to the hospital without serious risk, they were treated where they were when taken ill. In every case where a typhoid suspect or patient is transported, he should be treated as an ambulance patient in every sense of the word. A trained nurse is indispensable in the care of a typhoid case, from the standpoint of the patient, the family, the community, and, above all, the physician himself. The cases considered in this paper were all cared for by trained nurses, sometimes three for one patient, and sometimes two or more for several patients. One great advantage offered by the grouping of cases together, is the opportunity for several nurses to be present in case of an emergency. Each nurse, whether at a private house or in an emergency hospital, had at her command written orders for everything that was to be done, and was supplied with an emergency outfit for collapse, hemorrhage, perforation, etc.; written instructions of what to do for expected complications, and a list of the more prominent symptoms of each were given her. For every case of typhoid it may seem exaggerated care to have on hand and ready for immediate use the necessary drugs for the various complications, a simple saline infusion outfit, etc., but it saved several lives for me in handling these cases, and I have a wholesome fear of the drug-store delay. It is not only ideal, but absolutely necessary to give each private patient the advantages that come with a well-equipped hospital.

The first and last great problem of every typhoid case is the selection of proper food from the onset of the symptoms until complete health is restored, and that is, as a rule, not until several months have passed. Whenever possible, good unskimmed milk was given. The patient must be carefully studied as to milk digestion. Some did better with two-hourly feedings, some three-hourly or four-hourly; some could best be fed throughout the night; some required a long interval of rest for the stomach. No absolute rule could be laid down as to quantity or intervals of feedings.

A careful study of general nourishment, stools, tongue and abdomen soon makes the best plan clear. Various measures were adopted to suit the milk to the individual taste and digestion of the patient. I learned to look with great concern upon the patient who, in spite of various modifications, was never able to digest milk properly. The addition of limewater, sodium bicarbonate (sol  $\frac{1}{2}$  to Oil) in varying amounts; peptonization, the breaking up of the curd by means of small amounts of babies' foods, the simple dilution with water, the use of broken-up junket, often aided in accommodating the patient to milk. In other cases small amounts of coffee were useful in increasing the palatability of the milk, and the contained caffeine had a satisfactory systemic effect. Toast-milk, made by pouring hot milk over thoroughly browned toast and carefully straining it;

\*Occidental Medical Times, July, 1903.

or celery-milk, made by similarly adding some juice from boiled celery, often served a similar purpose. Cocoa or chocolate was badly borne in a number of cases that came under my observation in the practice of others, so it was not used by me even during recovery. There is no question in my mind that milk in some form can properly nourish the great majority of typhoid patients, and that before it is discarded as a diet, a most careful trial of it should be made. A most important point is to know when to stop the milk and begin to give other articles of food. The constant call of the convalescing patient is hard to resist, but must be put off in most cases until ten days or two weeks have elapsed after the febrile stage. In some cases any simple food might do well, but if it does not, the blame falls upon the physician, and it is hard for him to disclaim it. Theoretically, any finely divided food, or even masses of soft food, are in practically a fluid state when they reach the affected part of the bowel, and many physicians have used various forms of food freely; but it seems to me from observing the present cases, a much safer course is to allow no food that will not pass through a very fine strainer, to enter the bowel until two weeks free from fever have elapsed. It is hard to tell just what the exact state of stomachic and intestinal digestion is in a case of typhoid, and it is well to give the patient all possible advantage of the doubt. Two young patients under my care had just begun to convalesce at the same time, when they were given some simple cereal food by stealth, and they immediately had relapses more serious than the original run of fever.

In some cases when milk was not well borne, an ice cream made as follows was used with much success:  $\frac{1}{2}$  i milk,  $\frac{3}{4}$  i cream, sugar to faintly sweeten, vanilla flavoring, and frozen solid. This was usually the first food permitted during the recovery stage in all of the cases. If it was well borne, then the following foods in order given: (1) junket; (2) broth; (3) a thin, thoroughly cooked, well-strained oatmeal or farina gruel (boiled two hours), given at first once a day, and then gradually twice a day; (4) a small piece of thoroughly dried toast; (5) some well-cooked rice; (6) a little custard; (7) the juice of a chop; (8) a soft-boiled egg. Then there was a gradual resumption of a simple diet. Careful observation by the physician of the food given must be maintained, as cooks, mother and nurse may not appreciate the need of prolonged cooking.

When discharged, each patient was given a diet list, stating upon it when the different foods could be resumed, the aim being to avoid all indigestible foods and all foods with a marked residue for at least three months. Pieces of gristle and fresh fruit were particularly forbidden. The value of a simple diet for some time after typhoid is often not appreciated; good wholesome food with nourishing properties is required, but the future health of the patient, particularly as regards his digestive system, can be seriously endangered by the temptation to over eat and by the eating of indigestible foods during the somewhat unstable condition of the alimentary canal that follows typhoid. The avoidance of constipation is particularly necessary, and convalescent patients seem to be subject to hemorrhoids. During the epidemic, two patients came to me only because of hemorrhoids. They had evidently had a mild attack of typhoid infection for some weeks. Because of headache and digestive disturbances, they had eaten carefully, but had had great trouble with constipation. Both had partaken of infected milk, and their temperatures were subnormal. Careful feeding and rest soon helped them generally, but with one, a slight operation was necessary to relieve the moderately severe hemorrhoidal condition.

When milk could not be taken, recourse was had to mutton and chicken broth, beef juices, barley broths, etc., but nourishment was never satisfactory.

The various peptone preparations are of great value for a short space of time when milk must be stopped because of hemorrhage or perforation, but even here they have a real danger in that they often soon exert a laxative effect upon the bowel. It was of interest to note that in the postmortem of patients able to digest milk, ample body fat was found, but in those kept on the other foods mentioned, the body fat had largely disappeared.

**Water.**—When possible, large quantities of water, cold, slightly warmed or hot, were given, up to the amount of two gallons in twenty-four hours. This was usually possible without disturbing the digestion by giving the half an hour or so before the feedings. It usually left the stomach promptly, judging from the amount of gurgling to be heard in the region of the stomach soon afterward. In a toxic disease such as typhoid, the value of additional body fluid as an aid to elimination seems indisputable. In cases where water was not well borne by the stomach, careful rectal injections of normal saline infusion were readily absorbed, and had a favorable effect upon elimination, particularly by the kidney.

**Grape Juice.**—Frequently during the course of the fever, and particularly afterward, the addition of a small amount of unfermented grape juice, either that of the Concord grape or the California brand, was very acceptable to the patient, and aided in taking the water. Particularly was it found useful in the stage of decreased urinary elimination that was frequently observed in the convalescence. In some cases, even when the urine was reduced to 10 ounces in twenty-four hours, it had a most prompt diuretic effect, particularly when used at the same time with coffee in the milk given as food.

**Antipyretic Measures.**—In all of the febrile cases, an attempt was made to control the temperature by some form of bathing or the administration of external cold. In a majority of the cases, the abdominal coil, with an ice bag for the head, was used. The coil was usually well borne, and had a satisfactory effect upon the temperature. Frequently a piece of gauze is needed between it and the skin, especially with fat persons, in whom the abdominal wall is prone to freeze enough to slough. Two tubs were used, and iced water circulated slowly through the coil. It was found of great advantage to put a funnel covered with gauze over the receiving tube to keep out the dirt contained in most ice; and when the tube became stopped up, a foot bicycle pump promptly cleaned it out. When properly managed, a hard rubber coil is easily handled, and is a comfort to the patient and nurse rather than a source of annoyance. The coil should be carefully selected in order to avoid the soft rubber so often sold. Usually the coil was left on when the temperature was over 100° F. If, in spite of the coil, the temperature rose to over 101.5° F to 102° F, a cold or tepid sponge was given. If it rose still higher, an ice sponge with much friction; if still higher, an ice pack with friction. No tub baths were used or found necessary, and I dread for a typhoid patient the amount of necessary manipulation that a tub bath necessitates. The ice pack did well with the highest temperatures, and was particularly effective when the nervous symptoms became unduly exaggerated. As a rule, it was not found to be depressing to the circulation, although a stimulant was usually given during or following it. The results obtained from its use were at times most striking, particularly when delirium, subsultus tendinum, and even general convulsive body movements resisted other attempts to control them. Particularly was this sedative effect noticeable upon an unusually strong athlete, who, in spite of the efforts of three or four nurses, would get out of bed and walk around whenever his temperature rose to 104°. Wrapping a patient in a sheet wrung out of ice water was frequently resorted to in the very nervous, especially the delirious cases, to induce sleep, and was usually

successful. The presence of pneumonia, or even double pneumonia, was not allowed to interfere with the use of the various applications of cold for the reduction of temperature. But in the patients subject to collapses, great care was found to be necessary in the use of all measures for controlling the temperature, and frequently it was found to be safer to leave off the cold entirely while the danger of collapse seemed imminent. But this was true only to a certain extent, for in the febrile cases, with collapses, when a temperature of about 104° was reached, the collapses were more apt to appear, and so all moderate means to prevent so high a temperature were used.

The question of the increased danger from hemorrhage in the use of the abdominal coil is of interest. Of the nine cases of intestinal hemorrhage that came under my observation, three patients never had the coil used upon them before the hemorrhages took place. The six cases of hemorrhage where the coil was used were all very severe cases, and I thought the coil of great advantage rather than harm, and that it limited the flow of blood. When the hemorrhages did occur, the coil was at once reenforced by a second coil on top of it, or several large, flat ice bags, or both. Such treatment was evidently effective.

**Use of Drugs: Intestinal Antiseptics and General Measures.**—The selection of a routine drug for typhoid fever, for the purpose of general intestinal antiseptics or for a direct effect upon the typhoid bacillus in the body, is a matter that comes up in every case. It seems clear to me that, until we have proper anti-typhoid serums, we cannot hope to administer any drug, particularly by mouth, that will directly affect the active typhoid bacillus. We may be able to get into the bowel a chemical substance that will destroy the free bacteria there without injuring the intestinal mucous membrane, but we certainly cannot hope to reach the bacilli in Peyer's patches, and those buried in the mucous membrane. These are the ones that are doing the damage. The best that we can hope for at present is a moderate control of the general fermentation, particularly the exaggerated fermentation frequently accompanying the disturbed intestinal digestion of typhoid. This should, when needed, be attempted in each case; but the greatest care is necessary in the selection of a drug for routine use, because the body has enough to do in combatting the toxins injuring and damaging its various cells and tissues without adding depressing or irritating drugs to hamper the heart or injure the kidney. The array of so called specific drugs with which a physician, in a community where typhoid is prevalent, is assaulted from various sources, particularly pharmaceutical firms, is astonishing. In many cases I found that no drug treatment was good treatment; but in others, where the intestinal disturbance was marked, I found that a capsule of salol gr. ii or iii, guaicol carbonate gr. i to iii, given one to three times per day was of great service. But its administration was always carefully checked by urinary examinations, and I never felt secure or unconcerned in its use. In severe cases of fermentation with loss of bowel tone and distension of abdomen, almost uniformly gratifying results were obtained from the use of oil of turpentine given in an emulsion with compound spirits of lavender. The dose varied from a drop to thirty drops of the rectified turpentine. Its value, particularly combined with the external use of turpentine stupes to the abdomen, was frequently most striking, but the urinary secretion had to be carefully watched.

**Stimulants.**—In the majority of cases treated by me, brandy or whisky was used at some time during the fever, and frequently throughout the period of severe symptoms. Its value was often striking, particularly in cases where the general nourishment was

poor; where the pulse became thready and unsatisfactory, and where pneumonia was present. When beneficial, it had no bad effects that I could ascertain, even though taken in large amounts. It seemed to be readily consumed and of great general body help, as well as an aid to the cardiac muscle. In cases where its administration produced the series of symptoms that one sees from its use in healthy men, it was not found to be of much value, and was temporarily or permanently discarded. Giving it in milk was often unwise, as it seems at times to interfere with the digestion of the milk and to turn the patient against milk as a food.

**Strychnin.**—The value of strychnin in typhoid was frequently tested, and, while not without its dangers, was found to be of the greatest service. Particularly was this true for prompt stimulation when required during the fever, and for fairly regular administration, either in tablets or in a syrup with hypophosphates, iron, etc., during the convalescent period. In only one case did it seem to increase the nervousness; in most patients it rather lessened the nervous symptoms. Its great danger is its stimulation of peristalsis and the temptation to use it when the collapse following hemorrhage occurs. Its value in the treatment of collapse will be noticed under a later heading.

**Caffein Citrate.**—This drug, by mouth or hypodermically, was found particularly valuable as a cardiac stimulant and diuretic when the strychnin alone was not successful.

**Sedatives.**—The cold pack was the most uniformly successful sedative and hypnotic used. The best drug was heroin hydrochlorid gr. 1-24 to 1-12 given hypodermically. It was of the greatest value for hypnosis, but frequently quieted delirium and convulsive movements. Morphin was occasionally used, but not with gratifying results, for although it frequently helped temporarily, it seemed to disorganize digestion and increase the tendency to constipation so much that it did more harm than good. Heroin also is not blameless in these regards, but was found not to be so troublesome as morphin.

**Chloretone**, in doses of 5 to 30 grains, particularly when combined with sodium bromide, and given in a warm, small, mucilaginous, fairly high rectal injection, was frequently strikingly helpful and not noticeably depressing. In several cases when all other sedative measures failed, a hypodermic injection of 1-200 to 1-75 of a grain of hydrobromate of hyoscin had a prompt and most beneficial effect.

**Enemas and Laxatives.**—A most uniform manifestation of this typhoid epidemic was the presence of obstinate constipation. Its control was a matter of considerable concern. In many cases, small daily low injections of glycerin 1 oz., water 3 ozs., were alone required. In others soapsuds injections in somewhat larger quantity. Great care was taken not to use plain water, which merely distends the bowel, and depends upon that for the excitation of peristalsis, rather than on a chemotaxic effect, and also not to use too large a quantity or put it in too high. Where saline injections were given for general effect or to flush the lower bowel rather than to excite peristalsis, great care was taken not to have them given too high, too great in quantity, too rapidly or with too great pressure. The postmortem observation of a typhoid colon is sufficient to show that if distension did not directly induce hemorrhage or perforation, it could bring about marked changes in the repair of the ulcerated areas. In very obstinate cases of constipation, it was considered wiser to use a combined enema of turpentine  $\mathfrak{z}$ i to  $\mathfrak{z}$ iv, molasses  $\mathfrak{z}$ v, Epsom salts  $\mathfrak{z}$ ii to  $\mathfrak{z}$ vii, and water  $\mathfrak{O}$ ii, rather than to excite too great and continued peristalsis by large doses of cathartic drugs.

(To be continued.)